New trends of Cellular Networks
- Openness would allow richer applications to run on mobile phones
- Witness a similar evolution of worms as have been seen in wired world

Mobile Worms
- Mobile worm vs. Internet worm
- Slow start and exponential propagation
- Rely on social engineering (user interaction) for worm activation

Social Network based Patching Scheme
- Contest between worm propagation and patch dissemination
- Uniform patching vs. Targeted patching
  - Time limits
  - Bandwidth bottlenecks

Targeted Patching
- Only mobile devices which act as a bridge between social clusters within the network should be patched first
- Balanced Patching vs. Clustered Patching

Balanced Patching
- Keep the damage to each partition balanced
  - i.e. multilevel KL algorithm

Clustered Patching
- Keep mobiles close to each other staying in the same partition, and divide nodes that are not close into different partitions
- NP-hard Problem

Heuristic Recursive Algorithm
- Expanding Stage
  - Grow each partition $P$ by adding new nodes to it until $C(P)$ does not increase any longer
- Contracting Stage
  - Each partition $P_i$ contracts to a node $i$, all the interconnection edges between two partitions $P_i$ and $P_j$ become an edge $e(i,j)$, $w(i,j) = C(P_i, P_j)$
- Restoring Stage
  - Replacing each condensed node in each partition with its original nodes

Methods

Self-Propagated MMS Worms
- Exploring contact list (phonebook)
- Exploring contact history (traffic records)
- Trust within close friends wins higher chance of infection success

Cellular Social Relationship Graph
- Social networking between mobiles
- Predict the worm propagation pattern
- Traffic traces to a topology graph

Social Network Based Worm Containment in Cellular Networks
Zhichao Zhu, Guohong Cao

Patching by Graph Partitioning

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